

WHAT IS CLAIMED IS:

1. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising an elongate composite structure adapted to constrict the stomach or esophagus of the patient, wherein said elongate composite structure is composed of a base material making said composite structure self-supporting and property improving means for improving at least one physical property of said composite structure other than self-supporting properties.

2. An implantable constriction device according to claim 1, wherein said property improving means comprises a coating on said base material at least along a side of said elongate composite structure that is intended to contact the stomach or esophagus, said coating having better aggressive body fluid resistant properties than said base material.

3. An implantable constriction device according to claim 2, wherein said coating is selected from the group consisting of a Teflon™, Parylene™ poly-para-xylylene polymer, and a biocompatible metal coating.

4. An implantable constriction device according to claim 3, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

5. An implantable constriction device according to claim 2, wherein said property improving means comprises a core of a viscoelastic material covered with said self-supporting base material.

6. An implantable constriction device according to claim 5, wherein hard silicone constitutes said base material.

7. An implantable constriction device according to claim 5, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

8. An implantable constriction device according to claim 2, wherein said base material forms an inflatable tubing.

9. An implantable constriction device according to claim 8, wherein said tubing has an inner surface defining the interior of said tubing, and said coating covers said inner surface.

10. An implantable constriction device according to claim 8, wherein said coating is selected from the group consisting of Teflon™ tetrafluoroethylene polymer, Parylene™ poly-para-xylylene polymer, and a biocompatible metal coating.

11. An implantable constriction device according to claim 10, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

12. An implantable constriction device according to claim 8, wherein hard silicone constitutes said base material.

13. An implantable constriction device according to claim 8, wherein said base material forms two coaxial tubular layers and said property improving means comprises a tubular intermediate layer of a viscoelastic material located between said coaxial tubular layers.

14. An implantable constriction device according to claim 13, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

15. An implantable constriction device according to claim 8, wherein said base material forms an outer tubular layer, an inner arcuate layer attached to said outer tubular layer, said outer and inner layers defining a curved space extending longitudinally along said tubing, and said property improving means comprises viscoelastic material filling said space.

16. An implantable constriction device according to claim 15, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

17. An implantable constriction device according to claim 1, wherein said property improving means comprises a coating on said base material at least along a side of said elongate composite structure that is intended to contact the stomach or esophagus, said coating having better anti-friction properties than said base material.

18. An implantable constriction device according to claim 17, wherein said

coating is selected from the group consisting of a Teflon™ tetrafluoroethylene polymer, Parylene™ poly-para-xylylene polymer, and a biocompatible metal coating.

19. An implantable constriction device according to claim 18, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

20. An implantable constriction device according to claim 17, wherein said property improving means comprises a core of a viscoelastic material covered with said self-supporting base material.

21. An implantable constriction device according to claim 20, wherein hard silicone constitutes said base material.

22. An implantable constriction device according to claim 20, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

23. An implantable constriction device according to claim 17, wherein said base material forms an inflatable tubing.

24. An implantable constriction device according to claim 23, wherein said tubing has an inner surface defining the interior of said tubing, and said coating covers said inner surface.

25. An implantable constriction device according to claim 23, wherein said coating is selected from the group consisting of a Teflon™ tetrafluoroethylene polymer, Parylene™ poly-para-xylylene polymer, and a biocompatible metal coating.

26. An implantable constriction device according to claim 25, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

27. An implantable constriction device according to claim 23, wherein hard silicone constitutes said base material.

28. An implantable constriction device according to claim 23, wherein said base material forms two coaxial tubular layers and said property improving means comprises a tubular intermediate layer of a viscoelastic material located between said coaxial tubular layers.

29. An implantable constriction device according to claim 28, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

30. An implantable constriction device according to claim 23, wherein said base material forms an outer tubular layer, an inner arcuate layer attached to said outer tubular layer, said outer and inner layers defining a curved space extending longitudinally along said tubing, and said property improving means comprises a viscoelastic material filling said space.

31. An implantable constriction device according to claim 30, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

32. An implantable constriction device according to claim 1, wherein said base material forms a first layer and said property improving means comprises a second layer applied on said first layer, said second layer being more fatigue resistant than said first layer.

33. An implantable constriction device according to claim 32, wherein said second layer covers said first layer of said base material along a side of said elongate composite structure that is intended to contact the stomach or esophagus.

34. An implantable constriction device according to claim 32, wherein said second layer comprises a polyurethane layer.

35. An implantable constriction device according to claim 32, wherein said property improving means comprises a coating coated on said first layer and/or said second layer, said coating having better aggressive body fluid resistance properties and/or better anti-friction properties than said base material.

36. An implantable constriction device according to claim 35, wherein said coating is selected from the group consisting of Teflon™ tetrafluoroethylene polymer, Parylene™ poly-para-xylylene polymer, and biocompatible metal coating.

37. An implantable constriction device according to claim 36, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

38. An implantable constriction device according to claim 32, wherein hard silicone constitutes said base material.

39. An implantable constriction device according to claim 32, wherein said first layer of said base material forms an inflatable tubing, and said second layer covers said base material within said tubing.

40. An implantable constriction device according to claim 1, wherein said base material forms an inflatable tubing and said property improving means comprises a liquid impermeable coating coated on said base material.

41. An implantable constriction device according to claim 40, wherein said tubing has an external surface of said base material and an internal surface of said base material defining the interior of said tubing, said coating being coated on said external surface and/or internal surface.

42. An implantable constriction device according to claim 40, wherein said coating is selected from the group consisting of Parylene™ poly-para-xylylene polymer and a biocompatible metal coating.

43. An implantable constriction device according to claim 42, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

44. An implantable constriction device according to claim 40, wherein hard silicone constitutes said base material.

45. An implantable constriction device according to claim 40, wherein said base material forms two coaxial tubular layers and said property improving means comprises a tubular intermediate layer of a viscoelastic material located between said coaxial tubular layers.

46. An implantable constriction device according to claim 44, wherein said viscoelastic material comprises silicone gel, cellulose gel or collagen gel.

47. An implantable constriction device according to claim 40, wherein said base material forms an outer tubular layer and an inner arcuate layer attached to said outer tubular layer, said outer and inner layers defining a curved space extending longitudinally along said tubing, and said property improving means comprises viscoelastic material filling said space.

48. An implantable constriction device according to claim 47, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

49. An implantable constriction device according to claim 1, wherein said property improving means comprises gas contained in a multiplicity of cavities formed in said base material to improve the flexibility of said composite structure.

50. An implantable constriction device according to claim 49, wherein said cavities are defined by net structures of said base material.

51. An implantable constriction device according to claim 49, wherein Teflon™ tetrafluoroethylene polymer constitutes said base material.

52. An implantable constriction device according to claim 49, wherein said composite structure forms an inflatable tubing.

53. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising an elongate composite structure adapted to constrict the stomach or esophagus of the patient, wherein the composite structure includes an elongate biocompatible self-supporting base material having surfaces exposed to aggressive body cells, when the constriction device is implanted in the patient, and a cell barrier coating coated on said surfaces to prevent body cells from breaking down the base material.

54. An implantable constriction device according to claim 53, wherein said barrier coating is selected from the group consisting of Parylene™ poly-para-xylylene polymer and a biocompatible metal coating.

55. An implantable constriction device according to claim 54, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

56. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising:

elongate means for constricting the stomach or esophagus of the patient, the constricting means including

means for making the constricting means self-supporting, and

means for improving at least one physical property of said constricting means other than self-supporting properties.

57. An implantable constriction device according to claim 56, wherein said property improving means improves the resistance to aggressive body cells or the anti-friction properties of said constricting means.

58. An implantable constriction device according to claim 57, wherein said property improving means comprises a coating on said self-supporting means at least along a side of said elongate constricting means that is intended to contact the stomach or esophagus.

59. An implantable constriction device according to claim 58, wherein said coating is selected from the group consisting of a Teflon™, Parylene™ poly-paraxylylene polymer, and a biocompatible metal coating.

60. An implantable constriction device according to claim 59, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

61. An implantable constriction device according to claim 56, wherein said property improving means improves the flexibility of said constricting means.

62. An implantable constriction device according to claim 61, wherein said property improving means comprises a core of a viscoelastic material covered with said self-supporting base material.

63. An implantable constriction device according to claim 62, wherein hard silicone constitutes said self-supporting means.

64. An implantable constriction device according to claim 62, wherein said viscoelastic material is selected from the group consisting of silicone gel, cellulose gel, and collagen gel.

65. An implantable constriction device according to claim 61, wherein said property improving means comprises gas contained in a multiplicity of cavities formed in said self-supporting means to improve the flexibility of said constricting means.

66. An implantable constriction device according to claim 65, wherein said cavities are defined by net structures of said self-supporting means.

67. An implantable constriction device according to claim 65, wherein Teflon™ tetrafluoroethylene polymer constitutes said self-supporting means.

68. An implantable constriction device according to claim 56, wherein said property improving means improves the fatigue resistance of said constricting means.

69. An implantable constriction device according to claim 68, wherein said self-supporting means forms a first layer and said property improving means comprises a second layer applied on said first layer, said second layer being more fatigue resistant than said first layer.

70. An implantable constriction device according to claim 69, wherein said second layer covers said first layer of said self-supporting means along a side of said elongate constricting means that is intended to contact the esophagus or stomach.

71. An implantable constriction device according to claim 69, wherein said second layer comprises a polyurethane layer.

72. An implantable constriction device according to claim 56, wherein said property improving means improves the liquid impermeability of said constricting means.

73. An implantable constriction device according to claim 72, wherein said self-supporting means forms an inflatable tubing and said property improving means comprises a liquid impermeable coating coated on said self-supporting means.

74. An implantable constriction device according to claim 73, wherein said tubing has an external surface of said self-supporting means and an internal surface of said self-supporting means defining the interior of said tubing, said coating being coated on said external surface and/or internal surface.

75. An implantable constriction device according to claim 73, wherein said coating is selected from the group consisting of Parylene™ poly-para-xylylene polymer and a biocompatible metal coating.

76. An implantable constriction device according to claim 75, wherein the biocompatible metal coating is selected from the group consisting of gold, silver and titanium.

77. An implantable constriction device according to claim 55, wherein hard silicon constitutes said self-supporting means.

78. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising:

an elongate composite structure adapted to constrict the stomach or esophagus of the patient,

a base material of said composite structure making said composite structure self-supporting, and

a coating on said base material at least along a side of said elongate composite structure that is intended to contact the stomach or esophagus, said coating having

better aggressive body fluid resistant properties than said base material.

79. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising:

an elongate composite structure adapted to constrict the stomach or esophagus of the patient,

a base material of said composite structure making said composite structure self-supporting, and

a coating on said base material at least along a side of said elongate composite structure that is intended to contact the stomach or esophagus, said coating having better anti-friction properties than said base material.

80. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising:

an elongate composite structure adapted to constrict the stomach or esophagus of the patient,

a base material of said composite structure making said composite structure self-supporting, said base material forming a first layer, and

a second layer applied on said first layer, said second layer being more fatigue resistant than said first layer.

81. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising:

an elongate composite structure adapted to constrict the stomach or esophagus of the patient,

a liquid semi-permeable base material of said composite structure forming an inflatable tubing and making said composite structure self-supporting, and
a liquid impermeable coating coated on said base material.

82. An implantable constriction device for forming a restricted stoma opening in the stomach or esophagus of a patient, comprising:

an elongate composite structure adapted to constrict the stomach or esophagus of the patient, and

a base material of said composite structure making said composite structure self-supporting, said base material forming a multiplicity of gas-containing cavities to improve the flexibility of said composite structure.